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CULTURE *and* USES of

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OKRA

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OKRA, OR GUMBO, is a desirable addition to the vegetables grown in the home garden. It has been grown and used for years in the South, where it is found in almost every garden, and is increasing in popularity in the North.

In regions where the growing seasons are very short, okra plants may be started in a hotbed or greenhouse and transplanted to the open ground.

Okra is easily grown on any good soil, and a few plants will be sufficient for the average family.

The edible portion consists of the pods, which must be gathered and used while young and tender.

Okra is used mainly in soups, but may be served as a vegetable, boiled or baked, or as a salad. It may be kept for winter use by canning or drying.

CULTURE AND USES OF OKRA.

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OKRA AS A GARDEN PLANT.

OKRA, or "gumbo" as it is commonly called, is a tropical annual. It has for many years held an important place among the garden vegetables of the Southern States, where it is used mainly in soups and preparations of which meat forms an integral part. The young and tender seed pods are used and give a pleasant flavor to soups and stews.

The okra plant somewhat resembles that of cotton, though having much larger and rougher leaves and a thicker stem. Its flowers, which are similar to those of cotton in size, shape, and color, are always single, and there is very little variation between those of different varieties.

Some persons may not enjoy the flavor of okra at first, but after eating a few times of dishes containing it a taste is acquired.

Okra may be grown throughout the greater portion of the United States, except the extreme northern part, but only one crop can be produced during a season in the northern part of the country. In the region around New Orleans successive plantings are made and a constant supply is maintained. The plant will not endure frost, but the production of pods begins very soon after the plants start into rapid growth and continues for several weeks, especially if all pods are removed every day and no seeds are allowed to ripen upon the plants.

THE SOIL AND ITS PREPARATION.

Okra can be grown most successfully upon a rich mellow loam, plowed rather deeply and well worked over with pulverizing tools. After the seedlings become established and the roots get a firm hold of the soil, growth is very rapid and a large amount of available

plant food, especially of a nitrogenous nature, is required. Quick-acting commercial fertilizers may be applied in moderate quantities, but these should be well mixed with the soil. The same conditions that produce good cotton or corn are suitable for okra.

PLANTING THE SEED.

Throughout the Northern States planting should be done as early as possible in spring, or as soon as the soil is warm enough for the planting of general garden seeds. In the Southern States, where a continuous supply is desired, successive seedings of four or five weeks apart should be made. Plant in rows, $3\frac{1}{2}$ feet apart for the dwarf types and $4\frac{1}{2}$ feet for the larger growing varieties. Scatter the seeds in drills or plant loosely in hills and cover to a depth of 1 or 2 inches, according to the compactness and moisture content of the soil. The seeds may be planted with any good seed drill, but when placed in hills they should be separated 3 or 4 inches to allow space for the development of the stems. If the soil is reasonably warm, germination will take place within a few days, but should there be a heavy rainfall meantime the soil should be lightly cultivated between the rows and the crust broken over the seed by means of a garden rake.

CULTIVATION.

As soon as the plants are well established they may be thinned to three or four in a hill, or, if grown in drills, to 12 or 14 inches for the dwarf and 18 to 24 inches for the larger growing varieties. Vacant places from failure in germination may be filled in by transplanting. Cultivate like corn or cotton, keeping the ground well stirred and the surface soil loose, especially while the plants are small. After the leaves begin to shade the ground, very little cultivation is necessary except to keep the land free from weeds. A poor soil and insufficient moisture will yield pods of inferior size and quality, and irrigation may often be desirable in order to produce a marketable crop. The okra plants will usually continue to grow until late in the season, but after a time the pods are not so large or tender as those produced earlier. As the pod is the only part of the plant ordinarily used for food, it is desirable to secure a rapid and continuous growth in order to produce the greatest quantity of marketable pods.

GATHERING AND MARKETING.

As soon as the plants begin to set fruit the pods should be gathered each day, preferably in the evening. The flower opens during the night or early morning and fades after a few hours. The pollen must

be transferred during the early morning, and the pods thus formed will usually be ready for gathering during the latter part of the following day, although the time required to produce a marketable pod varies according to the age of the plant and the conditions under which it is grown. The pods should always be gathered, irrespective of size, while they are still soft and before the seeds are half grown. Figure 1 shows a flower, together with the pods formed the two

previous mornings, the middle one of which is in the proper condition for gathering. The full-grown pods shown to the right and left of the flower were from those allowed to mature for seed. The pods, after being gathered in large baskets, are sorted and placed upon the market in pint, quart, and half-peck berry boxes. To be in first-class condition the pods should reach the consumer within 36 hours after having been gathered, but may be kept for several days in cold stor-



FIG. 1.—Flower and pods of okra. The pod in the center is in prime condition for gathering; the larger pods have been allowed to mature for seed.

age or by moistening and spreading them thinly upon wooden trays in a cool cellar. The pods should never be shipped in tightly closed crates or in great bulk, as they have a tendency to become heated.

CULTIVATION FOR SEED.

If okra is to be grown for seed alone, only one variety should be planted, or if more than one variety is grown each should be separated from the other by at least one-fourth mile, to prevent mixing. When several varieties of okra are grown near each other no seed

should be saved except that produced by the method of bagging and hand pollination. To secure seed in this way is a rather simple matter when only a small quantity is required, as the pods formed on a single day when the plants are at their best will produce enough seed. The bags should be tied over the flower buds in the evening and the pollen transferred early the following day. Replace the bags immediately, as an insect or the wind may at any moment bring to the flower the pollen of another variety. After going over all the flowers of a variety it is well to return to the first three or four and repollinate them in order that they may receive pollen from different individual flowers of the same variety and to insure perfect fertilization. Before beginning upon another variety the brush used for transferring the pollen should be thoroughly cleaned. If a brush is not available, use a portion of a young leaf, folded together between the thumb and finger, to convey the pollen. This improvised brush should be discarded and a new one adopted for each variety. The bags need remain only during the day on which the pollen is transferred and may be replaced by a tag to mark the pod. The seed should remain on the plant until fully ripe.

INJURIOUS INSECTS AND THEIR CONTROL.¹

The okra plant, as a rule, suffers little injury from insects; the most important is the cotton bollworm, which bores into the pods and thus injures them for food. The principal enemies of okra are about the same as those which attack cotton, with the exception of the boll weevil. The pods are also attacked by the southern green plant bug and several other species of plant bugs which pierce the pods and extract the vital juices, but since these occur late in the season the loss from their attack is usually negligible. Blister beetles and leaf beetles, such as the cucumber beetles and flea beetles, attack the foliage, but even this damage has little effect on the production of fruit. Arsenate of lead, applied as a spray at the rate of 3 pounds of the paste or $1\frac{1}{2}$ pounds of the powdered form to 50 gallons of water, is the most effective remedy for insects which eat the foliage. In small gardens 10 level teaspoonfuls of powdered arsenate of lead are used to a gallon of water.

Among other insect enemies are the melon aphid and several forms of leafhoppers. The best remedy for these is a spray of nicotine sulphate, using three-eighths of a pint of a 40 per cent solution with 2 pounds of laundry soap to 50 gallons of water, or, for small gardens, 1 teaspoonful of nicotine sulphate and a 1-inch cube of hard soap to a gallon of water. This spray must be brought into contact with the bodies of the insects in order to kill them.

¹ Prepared in the Bureau of Entomology, Truck-Crop Insect Investigations.

For additional information in regard to okra insects and means of controlling them, apply direct to the Bureau of Entomology, United States Department of Agriculture. When in doubt as to the insect causing the damage, specimens should be furnished. This will facilitate identification of the pest so that the right remedy may be recommended.

USES.

The principal use of okra is in soups and various culinary dishes in which meats form an important part, as in the so-called gumbo soups, in which the young pods impart an excellent flavor besides giving a pleasant mucilaginous consistency. The young seeds are occasionally cooked in the same way as green peas, and the very young and tender pods are boiled and served as a salad with French dressing.

In countries where large quantities of the pods are consumed they are dried and preserved, to be used during the part of the year when a fresh supply can not be obtained. There are several methods of drying the pods. By one of these the pods are cut into slices crosswise and about one-half inch thick; the slices are then spread upon muslin-covered frames and dried, after which the okra is stored in thin bags until required for use. By another and a more common method the very young pods are strung upon coarse threads and hung up to dry (fig. 2). In Turkey alone tons of the pods are preserved in this manner each year. A variety much used for drying is that known as *petite gumbo*, or small okra. The pods of this variety are selected



FIG. 2.—Large pods of okra dried for winter use.

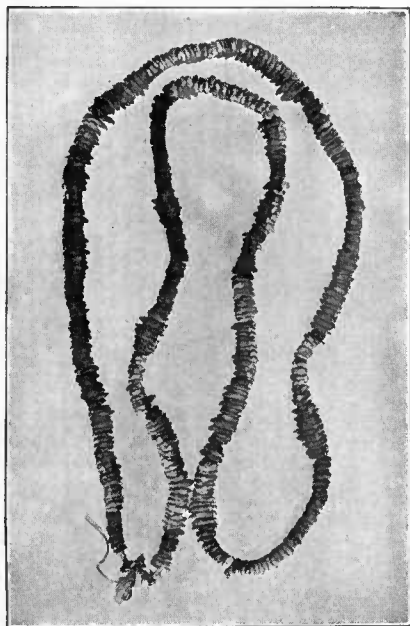


FIG. 3.—Small pods of okra dried for winter use.

when only about one-half inch in length and of uniform size. These are strung on a cord of coarse fiber and hung up to dry (fig. 3).

No copper, brass, or iron cooking vessels should be employed in preparing okra, as the metal will be absorbed and the pods discolored or even rendered poisonous. The cooking should be done in agate, porcelain, or earthenware vessels.

METHODS OF PREPARATION.

OKRA SOUP.

2 pounds of beef, without fat or bone.	4 quarts of cold water.
2 cupfuls of okra, chopped fine.	1 onion, sliced and chopped.
$\frac{1}{4}$ pound of butter.	Salt and pepper.

Cut the beef into small pieces and season well with pepper and salt. Fry it in the soup kettle with the onion and butter until very brown. Then add the cold water and let simmer for an hour and a half. Add the okra, and let simmer gently for three or four hours longer.

WINTER OKRA SOUP.

1 can of good New Orleans okra.	1 dozen oysters.
1 can of tomatoes.	3 tablespoonfuls of rice.
2 onions, chopped fine.	A red pepper pod, without the seeds.
2 tablespoonfuls of butter.	

Chop the onions and fry them in the butter. Wash the rice well, then stew the onions, tomatoes, and pepper together in about 3 quarts of water and 1 pint of oyster water for about three hours, stirring frequently. Ten minutes before serving add the okra and let it come to a boil. Then drop in the oysters, boil up once, and serve.

CHICKEN GUMBO.

1 chicken, weighing 3 or 4 pounds.	1 large slice of ham.
1 quart of sliced tomatoes.	1 bay leaf.
1 onion.	1 sprig of thyme or parsley.
$\frac{1}{2}$ pod of red pepper, without the seeds.	1 tablespoonful each of lard and butter.
2 pints of okra, or about 50 pods.	Salt and cayenne to taste.

Clean and cut up the chicken. Cut the ham into small squares or dice and chop the onion and the parsley or thyme. Skin the tomatoes and chop fine, saving the juice. Wash and stem the okra and slice into thin layers of one-half inch each. Put the lard and butter into the soup kettle and when hot add the chicken and the ham. Cover closely and let it simmer for about 10 minutes. Then add the chopped onions, parsley or thyme, and tomatoes, stirring frequently to prevent scorching. Then add the okra, and when well browned add the juice of the tomatoes, which imparts a superior flavor. The okra is very delicate and may scorch if not stirred frequently. For this reason many Creole cooks fry the okra pods separately in a frying pan, seasoning with the pepper, cayenne, and salt and then add them to the chicken. Equally good results may be obtained

with less trouble by simply adding the okra to the frying chicken and watching constantly to prevent scorching. The least taste of a "scorch" spoils the flavor of the gumbo. When well fried and browned, add about 3 quarts of boiling water and set on the back of the stove to simmer for about an hour longer. Serve hot with nicely boiled rice. Round steak may be substituted for chicken, but it must be borne in mind that the chicken gumbo is the best flavored.

Another recipe for gumbo which is very similar to the one just preceding, the process being practically the same, is as follows:

1 quart of tomatoes, sliced.	One-half pound of corned ham or pork,
2 pounds of good beef, cut in small pieces.	cut up.
2 quarts of okra, sliced.	Small piece of red pepper, without the seeds.
4 tablespoonfuls of butter.	Spray of parsley.

OKRA SALAD.

Boil the young okra pods whole. When cold, dress with vinegar, salt, and pepper, or, if preferred, use plain French dressing and serve very cold. This is a most delightful summer salad, the okra being very cooling.

BOILED OKRA.

1 quart of young okra.	Salt and pepper to taste.
1 tablespoonful of vinegar.	

Wash the okra well in cold water and place in a porcelain or agate saucepan. Add a pint of water and a teaspoonful of salt. Cover the saucepan and let the okra simmer for about half an hour. Place in a dish, season with salt and pepper, pour over the okra a tablespoonful of tarragon vinegar, and set to cool. Serve as a salad with roast meats, etc.

BAKED OKRA.

Place a thin layer of rice in a baking dish, add a layer of sliced okra, then a layer of sliced tomatoes; add salt, pepper, a little currie, and a small lump of butter. Repeat with alternate layers of rice, okra, and tomatoes until the dish is filled. Cover and bake in the oven until the rice is thoroughly cooked. Remove cover and brown on top. Serve in the baking dish. The rice should be washed in cold water before using and the okra pods and tomatoes washed and sliced rather thinly.

CANNED OKRA AND TOMATOES.

Equal parts of okra and tomatoes may be canned together for winter use. Cut the tender pods into short pieces and mix with the tomatoes; pack in cans and process at least 10 minutes longer than for tomatoes alone.

Another method is to blanch the okra pods for 10 minutes in boiling water, then dip into cold water to cool. Cut into sections, pack into the cans with the tomatoes, seal, and process as for tomatoes.

VARIETIES.

There are three general types of okra, viz, tall green, dwarf green, and lady finger.

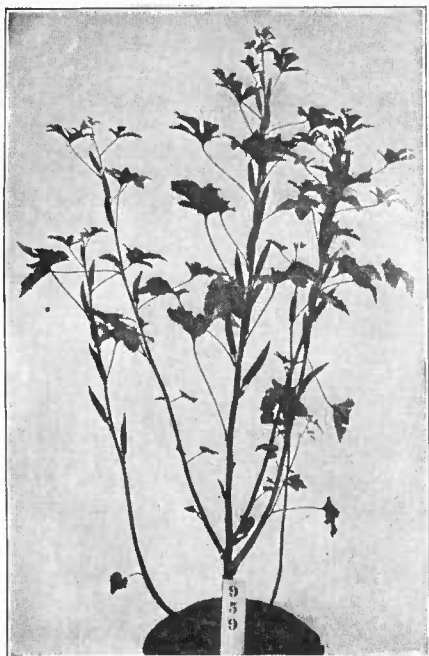


FIG. 4.—Tall green, long-pod type.

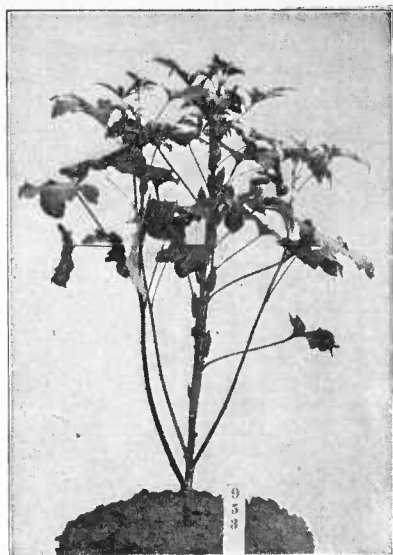


FIG. 5.—Tall green, short-pod type.



FIG. 6.—Dwarf green, long-pod type.

in all six classes or varieties, namely, tall green, long pod; tall green, short pod; dwarf green, long pod; dwarf green, short pod; lady finger, white pod; and lady finger, green pod. All variations from these are merely the results of mixtures, no true crosses or hybrids being formed. These mixtures are easily separated and referred to the parent type, and a little attention to roguing and selection is necessary in order to keep the varieties pure. It is essential that the varietal strain should be pure, in order that a uniform and marketable lot of pods may be produced.

DESCRIPTION OF TYPES.

Tall green.—Height of plant, 4 to 8 feet; habit of growth, upright, not spreading, sometimes branching

near the ground, but all stems erect; leaves large, borne on long petioles; pods in axils of leaves, on short stem; color of pods, green.

Tall green, long pod.—

Pods long, 3 to 5 inches when ready for marketing, 7 to 11 inches when mature; five-eighths to $1\frac{1}{4}$ inches in diameter; 5 to 8 sided. (Fig. 4.)

Tall green, short pod.—

Pods short, $1\frac{1}{2}$ to 2 inches when ready for marketing, 3 to 5 inches when mature; 1 to 2 inches in diameter; 7 to 11 sided. (Fig. 5.)

Dwarf green.—Height of plant, 20 inches to $3\frac{1}{2}$ feet; habit of growth, bushy, spreading from near the ground; leaves rather small, on slender petioles; pods green.

Dwarf green, long pod.—

Pods long, 2 to 4 inches when ready for marketing, 6 to 10 inches when mature; five-eighths to $1\frac{1}{4}$ inches in diameter; 5 to 8 sided, tapering to a point at the blossom

end, point usually curved inward toward the stem of the plant; leaves deeply cleft or divided. (Fig. 6.)

Dwarf green, short pod.—Pods short, $1\frac{1}{2}$ to 3 inches when ready for marketing, 3 to 6 inches when mature; $1\frac{1}{2}$ to $2\frac{1}{2}$ inches in diameter when fully grown; 7 to 12 sided; leaves large, almost entire. (Fig. 7.)

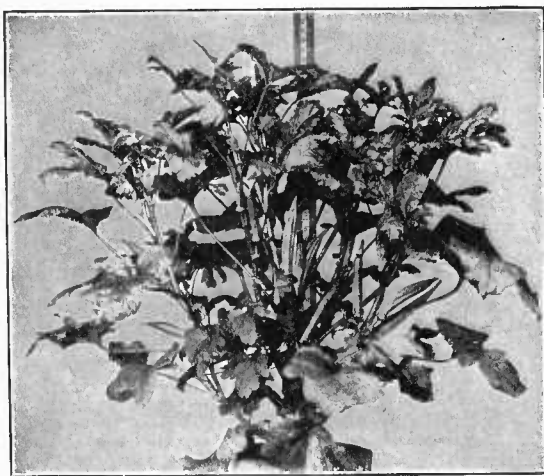


FIG. 8.—Lady-finger type.

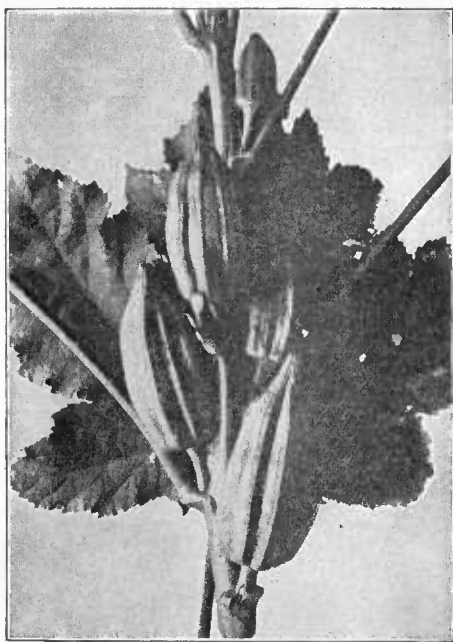


FIG. 7.—Dwarf green, short-pod type.

Lady finger.—Height of plant, about 3 feet, very much branched and of bushy habit; leaves large, borne on long petioles, the lower ones sometimes

more than 2 feet in length. The entire plant is of a lighter color than either of the other types. The only distinction between the varieties of this type is found in the color of the pods. Pods 4 to 5 inches long when ready for gathering, 6 to 10 inches when mature; three-fourths to $1\frac{1}{4}$ inches in diameter when mature; slightly 7 to 8 angled; and covered with numerous soft hairs. (Fig. 8.)

Lady finger, white pod.—Pods greenish white or nearly white.

Lady finger, green pod.—Pods pale green, in some cases nearly pure green.

The varieties known to the seed trade as Perkins's Mammoth, Long Green, Dwarf Green, and White Velvet are in most common use. The White Velvet is one of the best varieties, and there is but slight difference between varieties as regards earliness.

THE PRESIDENT TO THE FARMERS.

[From President Wilson's message to farmers in conference at Urbana, Ill., Jan. 31, 1918.]

THE FARMERS of this country are as efficient as any other farmers in the world. They do not produce more per acre than the farmers in Europe. It is not necessary that they should do so. It would perhaps be bad economy for them to attempt it. But they do produce by two to three or four times more per man, per unit of labor and capital, than the farmers of any European country. They are more alert and use more labor-saving devices than any other farmers in the world. And their response to the demands of the present emergency has been in every way remarkable. Last spring [1917] their planting exceeded by 12,000,000 acres the largest planting of any previous year, and the yields from the crops were record-breaking yields. In the fall of 1917 a wheat acreage of 42,170,000 was planted, which was 1,000,000 larger than for any preceding year, 3,000,000 greater than the next largest, and 7,000,000 greater than the preceding five-year average.

But I ought to say to you that it is not only necessary that these achievements should be repeated, but that they should be exceeded. I know what this advice involves. It involves not only labor but sacrifice, the painstaking application of every bit of scientific knowledge and every tested practice that is available. It means the utmost economy, even to the point where the pinch comes. It means the kind of concentration and self-sacrifice which is involved in the field of battle itself, where the object always looms greater than the individual. And yet the Government will help, and help in every way that is possible.

You will realize, as I think statesmen on both sides of the water realize, that the culminating crisis of

the struggle has come and that the achievements of this year on the one side or the other must determine the issue. It has turned out that the forces that fight for freedom, the freedom of men, all over the world as well as our own, depend upon us in an extraordinary and unexpected degree for sustenance, for the supply of the materials by which men are to live and to fight, and it will be our glory when the war is over that we have supplied those materials and supplied them abundantly; and it will be all the more glory because in supplying them we have made our supreme effort and sacrifice.

In the field of agriculture we have agencies and instrumentalities, fortunately, such as no other Government in the world can show. The Department of Agriculture is undoubtedly the greatest practical and scientific agricultural organization in the world. Its total annual budget of \$46,000,000 has been increased during the last four years more than 72 per cent. It has a staff of 18,000, including a large number of highly trained experts, and alongside of it stand the unique land-grant colleges, which are without example elsewhere, and the 69 State and Federal experiment stations. These colleges and experiment stations have a total endowment of plant and equipment of \$172,000,000 and an income of more than \$35,000,000, with 10,271 teachers, a resident student body of 125,000, and a vast additional number receiving instruction at their homes. County agents, joint officers of the Department of Agriculture and of the colleges, are everywhere co-operating with the farmers and assisting them. The number of extension workers under the Smith-Lever Act and under the recent emergency legislation has grown to 5,500 men and women working regularly in the various communities and taking to the farmer the latest scientific and practical information. Alongside these great public agencies stand

the very effective voluntary organizations among the farmers themselves, which are more and more learning the best methods of cooperation and the best methods of putting to practical use the assistance derived from governmental sources. The banking legislation of the last two or three years has given the farmers access to the great lendable capital of the country, and it has become the duty both of the men in charge of the Federal-reserve banking system and of the farm-loan banking system to see to it that the farmers obtain the credit, both short term and long term, to which they are entitled not only, but which it is imperatively necessary should be extended to them if the present tasks of the country are to be adequately performed. Both by direct purchase of nitrates and by the establishment of plants to produce nitrates, the Government is doing its utmost to assist in the problem of fertilization. The Department of Agriculture and other agencies are actively assisting the farmers to locate, safeguard, and secure at cost an adequate supply of sound seed. The department has \$2,500,000 available for this purpose now and has asked the Congress for \$6,000,000 more.

It was farmers from whom came the first shots at Lexington, that set aflame the Revolution that made America free. I hope and believe that the farmers of America will willingly and conspicuously stand by to win this war also. The toil, the intelligence, the energy, the foresight, the self-sacrifice, and devotion of the farmers of America will, I believe, bring to a triumphant conclusion this great last war for the emancipation of men from the control of arbitrary government and the selfishness of class legislation and control, and then, when the end has come, we may look each other in the face and be glad that we are Americans and have had the privilege to play such a part.

